What is claimed is:

1. A fault monitor for an electrical circuit, the circuit having a load, the fault monitor comprising:

a power supply connected in series with a resistor;

a connection for connecting to the circuit with the load in parallel with the resistor;

a voltage sensor connected in series with the resistor; and

switching means for opening and closing the connection between the power supply and the resistor and load;

whereby a fault within the load will change an equivalent resistance of the load, thereby changing the voltage sensed by the voltage sensor.

2. The fault monitor according to claim 1, wherein the switching means includes a first transistor having an entrance connected to the power supply, and an emitter connected to the resistor.

3. The fault monitor according to claim 2, wherein the first transistor is a PNP transistor.

4. The fault monitor according to claim 2, wherein the switching means includes a second transistor having an entrance connected to the power supply, and an input connected to a switch, with the input of the first transistor connected to the current path controlled by the second transistor.

5. The fault monitor according to claim 4, wherein the switch is a resistive voltage switch.

6. The fault monitor according to claim 4, further comprising a pair of resistors connected in series with the power supply and second transistor, with the input of the first transistor being connected between the pair of resistors.

7. The fault monitor according to claim 1, further comprising:

a second resistor connected in series with the power supply, the first transistor, and the resistor;

the connector for connection with the circuit being disposed between the resistor and the second resistor.

8. The fault monitor according to claim 1, further comprising a diode connected in series with the power supply, transistor, and resistor, the diode being structured to resist current flow from the resistor towards the power supply.

9. The fault monitor according to claim 1, further comprising a capacitor connected in parallel with the load and resistor, and in series with a ground.

10. The fault monitor according to claim 1, further comprising a capacitor connected in parallel with the voltage sensor and in series with a ground.

11. The fault monitor according to claim 1, further comprising a Zener diode connected in parallel with the voltage sensor and in series with a ground, the Zener diode being structured to divert current from the voltage sensor if the voltage exceeds a predetermined maximum for the voltage sensor.

12. The fault monitor according to claim 11, wherein the breakdown voltage of the Zener diode is about 5.1 volts.

13. The fault monitor according to claim 1, wherein the fault monitor is structured to be added to an existing electrical circuit by adding a single connection to the circuit between the power supply and the load.

14. The fault monitor according to claim 1, further comprising means for determining whether current is flowing within the load.

15. The fault monitor according to claim 14, wherein the means for determining whether current is flowing within the load include a test switching means connected in series with the resistor and in parallel with the current sensor, in sequence after the first transistor.

16. The fault monitor according to claim 15, wherein the test switching means includes a test transistor having an entrance connected to the power supply, an input connected to a test switch, and an emitter connected to a ground.

17. The fault monitor according to claim 16, wherein the test switch is a pull-down resistor switch.

18. The fault monitor according to claim 16, further comprising a resistor between the power supply and the test transistor.

19. A method of testing for faults in an electrical circuit, the circuit having a load, the method comprising the steps of:

providing a fault monitor, having:

a power supply connected in series with a resistor;

a connection for connecting to the circuit with the load in parallel with the resistor;

a voltage sensor connected in series with the resistor; and

switching means for opening and closing the connection between the power supply and the resistor and load;

connecting the fault monitor to the circuit with the load in parallel with the resistor;

passing a current through the circuit and fault monitor; and

detecting the resulting voltage at the voltage sensor, thereby determining whether the total resistance provided by the load indicates a failure within the load.

20. The method according to claim 19, wherein the step of determining whether a failure is present within the load includes determining a number of elements having faults within the load based on the difference between the resulting voltage and an expected voltage.

21. The method according to claim 19, further comprising the steps of:

providing a test switching means connected in series with the resistor and in parallel with the current sensor, in sequence after the first transistor;

closing the test switching means; and

determining whether voltage is sensed by the voltage sensor, thereby determining whether current is flowing through the load.

22. The method according to claim 21, wherein the steps of closing the test switching means and determining whether voltage is sensed by the voltage sensor are performed before passing a current through the circuit and fault monitor, and detecting the resulting current at the current sensor.

23. The method according to claim 21, wherein the steps of closing the test switching means and determining whether voltage is sensed by the voltage sensor are performed after passing a current through the circuit and fault monitor, and detecting the resulting voltage at the voltage sensor.